

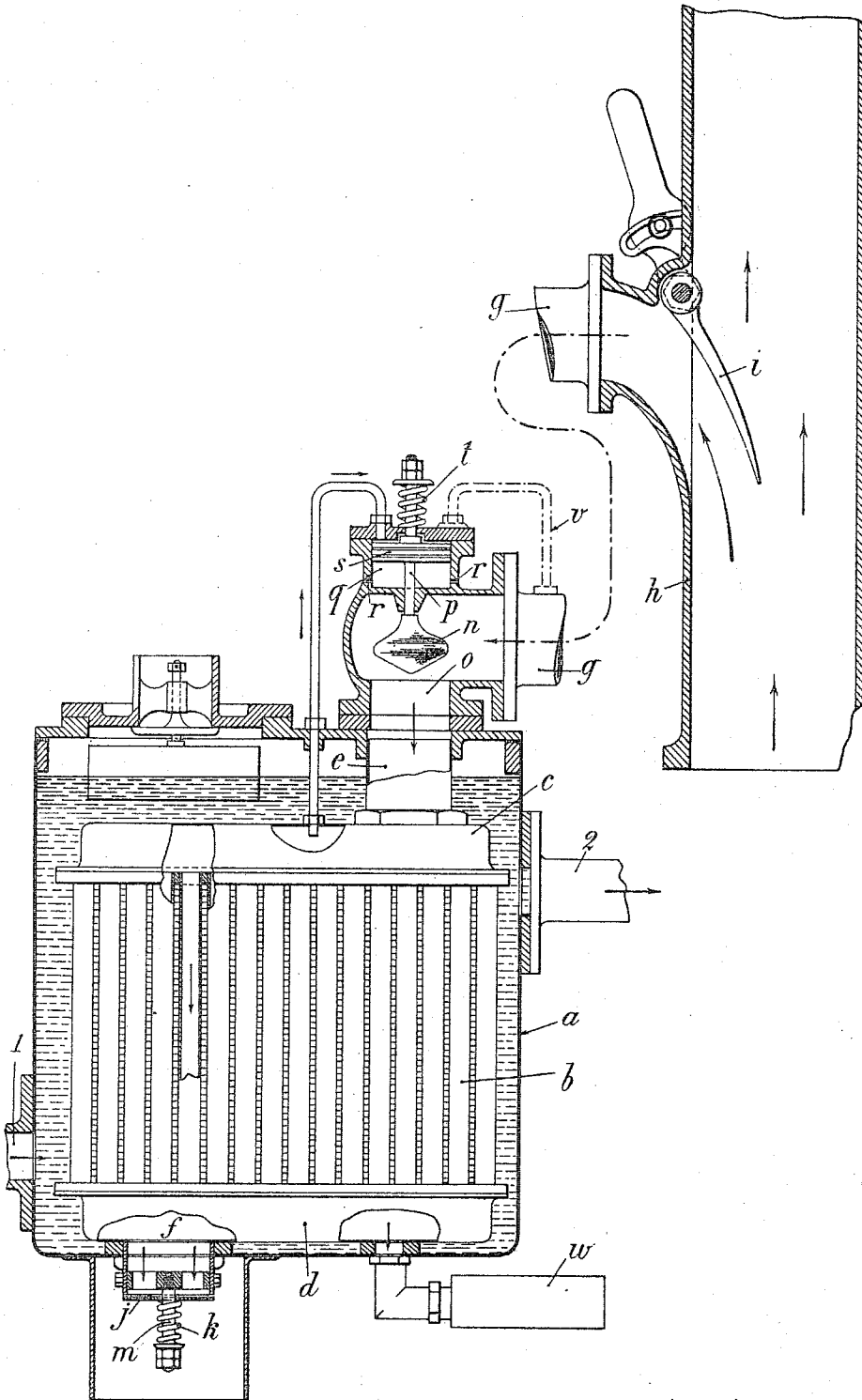
C. CAILLE.

FEED WATER HEATER.

APPLICATION FILED JAN. 10, 1911.

985,778.

Patented Mar. 7, 1911.



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CHARLES CAILLE, OF LE PERREUX, FRANCE.

FEED-WATER HEATER.

985,778.

Specification of Letters Patent.

Patented Mar. 7, 1911.

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To all whom it may concern:

Be it known that I, CHARLES CAILLE, of the Republic of France, residing at 24 Rue de la Gaité, Le Perreux, Seine, France, have invented new and useful Improvements in Feed-Water Heaters for Locomotive and other Boilers, of which the following is a specification.

The present invention has for its object a feed-water heater particularly applicable to locomotive boilers. This heater comprises a contrivance that automatically regulates the pressure of the steam taken from the exhaust passage of the engine and also the consumption of such steam, in order to insure, on the one hand, the heating of the feed-water whatever the rate of working of the engine may be, and on the other hand, to avoid taking from the exhaust passage an undue quantity of steam, such as to diminish the draft.

One form of construction of the invention is as a representative example shown in sectional elevation on the annexed drawing.

The heater comprises as do similar known contrivances a water container *a*, provided with inlet and outlet passages 1, 2, in the water of which is immersed a set of tubes *b* opening into two chambers *c*, *d*, connected respectively to a steam inlet pipe *e*, and a delivery pipe *f*. The chamber *d* may be provided with an automatic drain *w*. The pipe *e* is connected, in known manner, by a pipe *g*, to the exhaust passage *h* of the engine; this pipe being, as usual, provided with throttle valves, (not shown). The withdrawal of steam is ordinarily regulated by hand by means of a pivoted valve *i*. This valve is required to be suitably actuated each time a variation in pressure occurs in the exhaust passage *h*. If care is not taken to effect this regulation, the water in the container *a* will not be regularly heated, or on the other hand, excess of steam may be taken from *h*, with consequent diminution of draft, it being understood that, in locomotives the draft necessary for good working of the furnace is derived by means of an ejector or aspirator located at the top of the exhaust passage *h*.

The new contrivance avoids the necessity for any hand actuation of the valve *i*; the position of the latter can be determined once and for all, the organs added to the feed-heater insuring the automatic regulation of the amount of steam taken and the pressure

of this steam, whatever may be the rate of working of the engine.

The contrivance comprises a valve *j* guided on a rod *m* and loaded by a spring *k* 60 the tension of which can be regulated, this valve, provided at the escape passage of the steam, rests on a seating formed by the lower edge of the steam escape pipe *f*, when the tension of the spring is equal to or 65 greater than the pressure of the steam in the set of tubes *b*. It is thus obvious that by adjusting once and for all the tension of the spring *k*, the valve will be closed as soon as the pressure in the tubes falls to a 70 predetermined magnitude *P*. Relaxation of steam pressure in the heater and consequent fall in temperature is thus avoided. On the other hand, when the pressure of the steam 75 in the heater rises above a certain limit, the valve *j* opens, allowing relaxation of pressure sufficient to keep the temperature in the heater constant, but there is loss of steam through this valve. The contrivance also comprises an automatic valve provided 80 in the steam inlet pipe. In the example shown, this valve is constituted by a plug *n* of shape suitable to obstruct more or less the inlet opening *o*. The plug *n* is carried by a guided rod *p* terminating in a piston *s*, 85 which fits within a cylinder *q*, which communicates at its lower end with the atmosphere by means of orifices *r*. A spring *t*, which abuts respectively on the cover of the cylinder *q*, and on an enlargement on a pro- 90 longation of the rod *t*, tends to keep the plug *n* away from the opening *o*. A pipe *u* establishes communication between the steam chamber *c* of the set of tubes and the upper 95 end of the cylinder *q*, so that the upper surface of the piston *s* is always subjected to the pressure of the steam heater, while the lower surface is subjected to atmospheric pressure.

It is obvious that by suitably regulating 100 the tension of the spring *t*, the plug valve *n* can, for a given steam pressure in the heater, be maintained away from the orifice *o*; the valve *j* performing its ordinary function. If the pressure in the exhaust passage ex- 105 ceeds a predetermined amount *P*, the valve *j* tends to open; but the plug-valve *n* on the other hand tends to close, thus diminishing the flow of steam into the heater.

The upper portion of the cylinder *q* in- 110 stead of being put into communication with the chamber *c*, could by means of a pipe *v*

(indicated in dot-dash lines) be put into communication with the pipe *g*, and thus be more directly subjected to the action of the steam taken from the exhaust passage
5 of the engine.

I claim,

A heater for the feed-water of locomotive and other boilers, characterized by a contrivance for automatically regulating the
10 pressure and consumption of steam taken from the engine exhaust, this contrivance comprising two automatic valves located respectively in the steam escape and inlet pipes of the heater; the springs of these valves

being regulated in such a manner that the
15 escape valve closes when the steam pressure in the heater reaches a predetermined minimum, while the inlet valve closes when the steam pressure rises above a predetermined
20 maximum.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES CAILLE.

Witnesses:

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